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Accra Pac

01 0294

Contract No. 68-01-6669

EPA
U.S. ENVIRONMENTAL PROTECTION AGENCY

# TECHNICAL ASSISTANCE TEAM

## EMERGENCY ACTION PLAN

FOR

ACCRA PAC
ELKHART, INDIANA

*Region - V*

**ROY F. WESTON, INC.**
Spill Prevention & Emergency Response Division
In Association with Jacobs Engineering Group Inc. Tetra Tech Inc.
and ICF Incorporated

WESTON
DESIGNERS CONSULTANTS

# EMERGENCY ACTION PLAN

FOR

ACCRA PAC
ELKHART, INDIANA

Prepared For:

U.S. Environmental Protection Agency
Region V
536 S. Clark Street
Chicago, Illinois

CONTRACT NO. 68-95-0017

TAT-05-F-00769

TDD# 5-8511-11

Prepared by:

WESTON-SPER
Technical Assistance Team
Region V

January 1986

## 1.0 SITE LOCATION AND DESCRIPTION

The Accra Pac site is an abandoned aerosol packing plant located at 2600 Industrial Parkway, Elkhart, Indiana (Figure 1). The site contains 13 underground storage tanks of various capacities and containing varying amounts of liquid materials used during the prior operation of the site (Table 1). The tanks are reported to be single wall, steel tanks of unknown thicknesses; the age of the tanks is also unknown. The site measures approximately 300 feet in width by 400 feet in depth. Approximately three-quarters of the site is covered with concrete (Figure 2). Three below grade areas, previously used as loading docks, exist at the site.

The property is situated in an industrial park on the southeast side of the City of Elkhart, Indiana. Directly west of the site is a small lagoon that does not appear to be contaminated. Residential neighborhoods are located approximately three blocks north and south of the site.

## 2.0 SITE HISTORY

Until January 1976, the site was operated as an aerosol packing plant owned by Accra Pac, Inc., of Elkhart, Indiana. At that time, a fire and explosion occurred at the site that destroyed the plant and killed six people. Accra Pack has since built a new plant in Elkhart approximately one-half mile south of the original plant.

Accra Pack owned the abandoned site until January of 1977, at which time Mr. Warner Baker of Elkhart, Indiana, purchased the property. Mr. Baker remains owner of the Accra Pack site and has indicated plans to redevelop it as an industrial site in the near future.

At the time of the fire and explosion, several residents living one-half mile north of the site contacted the Elkhart County Health Department and requested that their well water be tested for contamination. Many of the residents of this area complained of poor odor and taste in their well water immediately following the fire. The Indiana State Board of Health (ISBH) sampled four residential wells located north of the site; however, these samples were not analyzed for organic contaminants. No apparent elevation in levels of inorganic contaminants was detected.

New interest in the site arose in May of 1985 when contamination was found within private residential wells located north and northwest of the site. The wells were found to be contaminated with trichloroethylene (TCE). The Technical

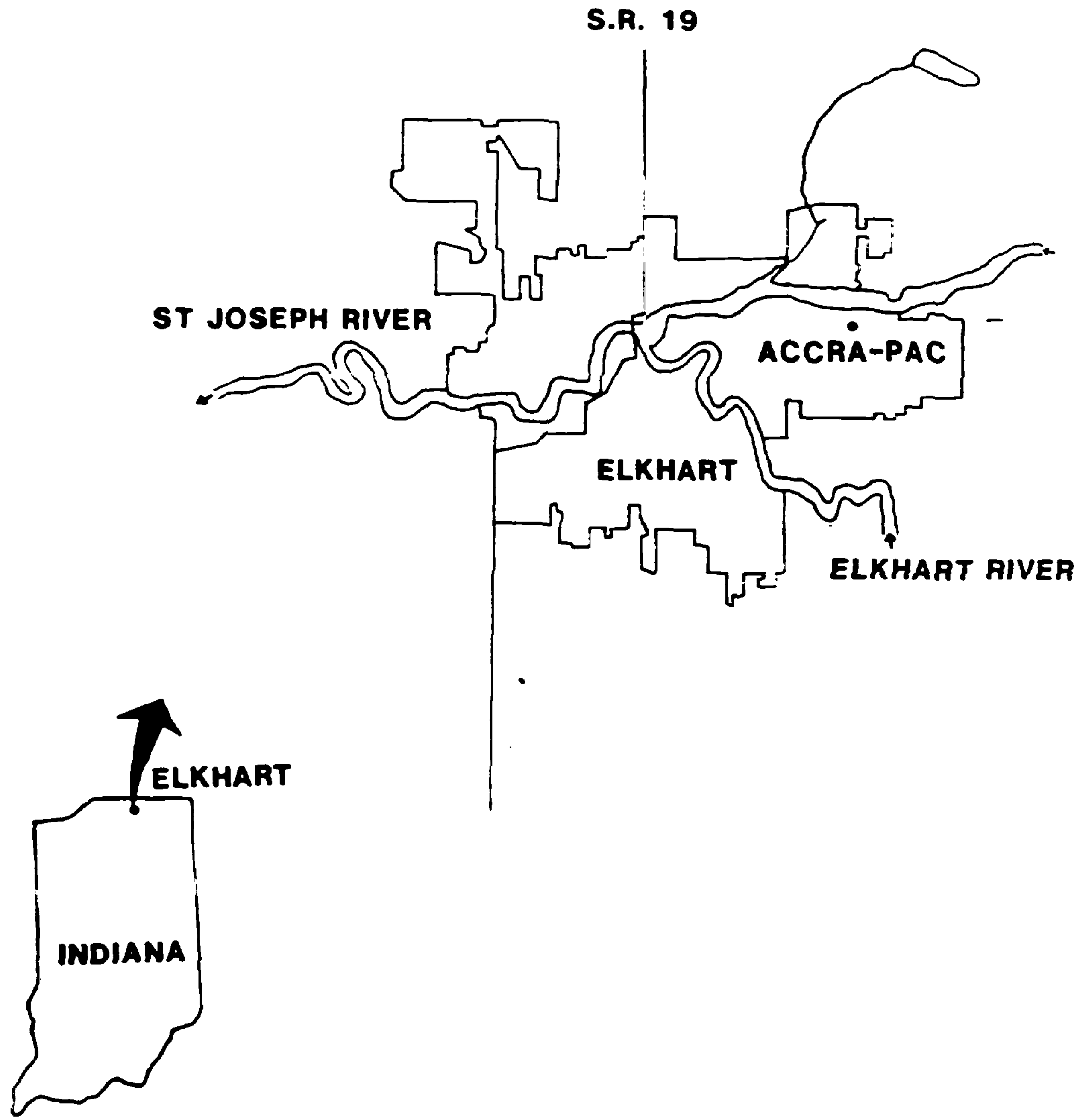


**FIGURE 1**

**SITE LOCATION**

**ACCRA- PAC**

**ELKHART, IN**

N

NO SCALE

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Jeffrey L. Siefferstein
January 20, 1986

TABLE 1

TANK CAPACITIES AND LIQUID LEVELS
ACCRA PAC, ELKHART, INDIANA

| Tank Number | Capacity (Gallons) | Amount of Liquid Measured (Inches) |
|---|---|---|
| T101 | 7000 | 8 |
| 102 | 4000 | 8 |
| 103 | 4000 | 30 |
| 104 | 4000 | 18 |
| 105 | 1500 | 15 |
| 106 | 6000 | 62 |
| 107 | 6000 | 6 |
| 108 | 4000 | Full |
| 109 | 4000 | Full |
| 110 | 6000 | 5 |
| 111 | 6000 | 65 |
| 112 | 6000 | 9.5 |
| 113 | 6000 | 16 |

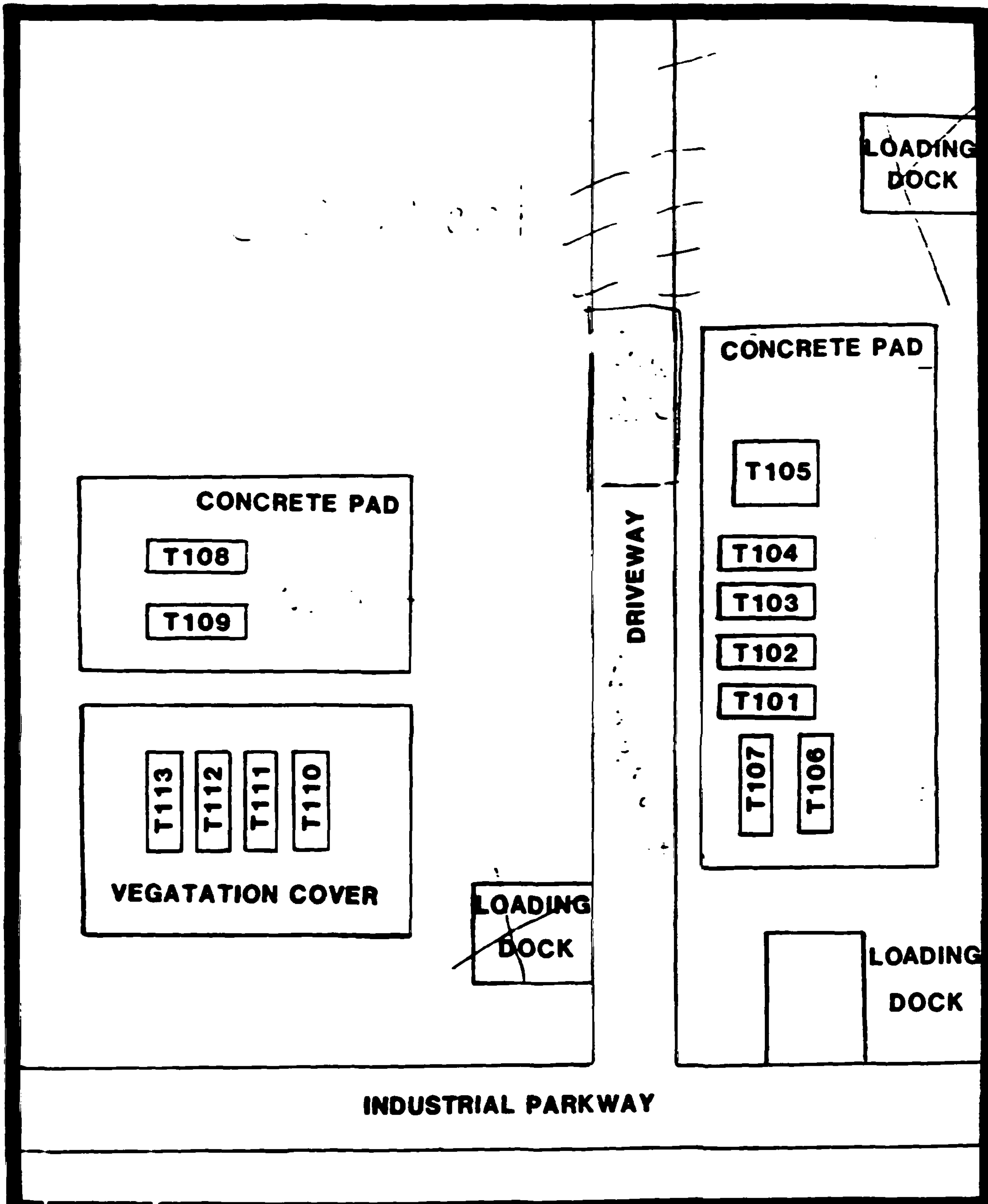


FIGURE 2
SITE DIAGRAM
ACCRA-PAC
ELKHART, IN

NO SCALE

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Assistance Team (TAT) subsequently conducted a sampling survey of private wells in the Elkhart area, including the area around the Accra Pac site. Results of this survey indicated several wells northwest of the site exceeded the 10 day Suggested No Adverse Response Level (SNARL) of 200 ppb for TCE. Many more wells contained TCE levels below the 10 day SNARL. Selected samples were also analyzed for partial or full VOC parameters which revealed a variety of other contaminants (Attachment A). Many of the affected wells are located northwest of the old Accra Pac site. Ground water flow direction is believed to be to the north- northwest at the location of the site (it should be noted however that the proximity of this area to the St. Joseph River may produce considerable, seasonal variation in local ground water flow direction).

## 3.0 THREATS TO PUBLIC HEALTH AND THE ENVIRONMENT

### 3.1 Summary of Existing Analytical Data

The TAT, responding to a request by the Waste Management Division of the U.S. EPA, sampled the buried tanks on August 28, 1985. The 13 tank samples collected were analyzed for volatile organic priority pollutants and flash points (Table 2). Results of the analysis are summarized below:

- T102 and T106 contained material with flash points below 56°F.
- T101, T104, T107, T112 contained material with flash points between 75° and 85°F.
- T103, T105, T108, T109, T110, and T113 contained material with flash points between 110° and 130°F.
- T111 contained material with a flash point above 160°F (This may be an erroneous result. Attachment B presents a graphing of total flammable component concentrations versus reported flash point; with the exception of the T111 sample, data for all tanks provided a reasonable fit to a curve representing a lowered flash point with increased concentration.)
- T102 contained toluene at a concentration of 460,000 ppm.
- T101 contained elevated levels of PCE (1.8 ppm), 1,1,1-trichloroethane (24.3 ppm), and toluene (105 ppm).

TABLE 2

VOC ANALYSIS AUGUST 28, 1985
ACCRA PAC SITE
ELKHART, INDIANA[1/]

| Tank # | 101 S-72 | 102 S-73 | 103 S-74 | 104 S-75 | 105 S-76 | 106 S-77 |
|---|---|---|---|---|---|---|
| Benzene | X | X | X | X | .0 | X |
| Bromoform | X | X | X | X | X | X |
| Bromomethane | X | X | X | X | X | X |
| Carbon tetrachloride | X | X | X | X | X | X |
| Chlorobenzene | X | X | X | X | X | X |
| Chloroethane | X | X | X | X | X | X |
| 2-Chloroethylvinyl ether | X | X | X | X | X | X |
| Chloroform | X | X | X | X | X | X |
| Chloromethane | X | X | X | X | X | X |
| Dibromochloromethane | X | X | X | X | X | X |
| 1,2-Dichlorobenzene | X | X | X | X | X | X |
| 1,3-Dichlorobenzene | X | X | X | X | X | X |
| 1,4-Dichlorobenzene | X | X | X | X | X | X |
| Dichlorobromomethane | X | X | X | X | X | X |
| 1,1-Dichloroethane | 0.26 | X | X | X | 0.38 | 300 |
| 1,2-Dichloroethane | X | X | X | X | X | X |
| 1,1-Dichloroethylene | X | X | X | X | X | 400 |
| 1,2-Dichloroethylene | X | X | 40 | X | X | X |
| Dichloromethane | 2.20 | X | 40 | 60 | 0.06 | 74,000 |
| 1,2-Dichloropropane | X | X | X | X | X | X |
| cis-1,3-Dichloropropene | X | X | X | X | X | X |
| trans-1,3-Dichloropropene | X | X | X | X | X | X |
| Ethylbenzene | 260.00 | X | X | X | X | X |
| 1,1,2,2-Tetrachloroethane | X | X | X | X | X | X |
| Tetrachloroethylene | 1.80 | X | X | X | 0.02 | X |
| Toluene | 105.00 | 460,000 | 70 | 1,100 | 2.47 | 200 |
| 1,1,1-Trichloroethane | 24.30 | 400 | 1,000 | 30 | 0.380 | 61,000 |
| 1,1,2-Trichloroethane | X | X | X | X | X | X |
| Trichloroethylene | X | X | X | X | X | X |
| Vinyl Chloride | X | X | X | X | X | X |
| m-Xylene | 0.55 | X | X | 40 | 1.27 | 200 |
| o & p-Xylene (as o-Xylene) | 1.03 | X | X | 70 | X | 1,100 |
| Flash Point (°F) | 74 | <55 | 114 | 78 | 126 | <56 |

[1/] All concentrations in parts per million (ppm).
X = Analyzed but not detected.

TABLE 2 (Continued)

VOC ANALYSIS AUGUST 28, 1985
ACCRA PAC SITE
ELKHART, INDIANA[1/]

| Tank # / Concentration Units | 107 S-78 | 108 S-79 | 109 S-80 | 110 S-81 | 111 S-82 | 112 S-83 | 113 S-84 |
|---|---|---|---|---|---|---|---|
| Benzene | X | X | X | X | X | X | X |
| Bromoform | X | X | X | X | X | X | X |
| Bromomethane | X | X | X | X | X | X | X |
| Carbon tetrachloride | X | X | X | X | X | X | X |
| Chlorobenzene | X | X | X | X | X | X | X |
| Chloroethane | X | X | X | X | X | X | X |
| 2-Chloroethylvinyl ether | X | X | X | X | X | X | X |
| Chloroform | X | X | X | X | X | X | X |
| Chloromethane | X | X | X | X | X | X | X |
| Dibromochloromethane | X | X | X | X | X | X | X |
| 1,2-Dichlorobenzene | X | X | X | X | X | X | X |
| 1,3-Dichlorobenzene | X | X | X | X | X | X | X |
| 1,4-Dichlorobenzene | X | X | X | X | X | X | X |
| Dichlorobromomethane | X | X | X | X | X | X | X |
| 1,1-Dichloroethane | .017 | X | X | X | 38 | X | X |
| 1,2-Dichloroethane | X | X | X | X | X | X | X |
| 1,1-Dichloroethylene | X | X | X | X | X | X | X |
| 1,2-Dichloroethylene | X | X | .04 | X | X | X | X |
| Dichloromethane | .09 | 1.00 | 2.60 | X | 400 | 0.80 | X |
| 1,2-Dichloropropane | X | X | X | X | X | X | X |
| cis-1,3-Dichloropropene | X | X | X | X | X | X | X |
| trans-1,3-Dichloropropene | X | X | X | X | X | X | X |
| Ethylbenzene | .02 | 20.00 | 30.00 | X | 0.020 | 30.00 | 10.00 |
| 1,1,2,2-Tetrachloroethane | X | X | X | X | X | X | X |
| Tetrachloroethylene | .01 | X | X | X | X | X | X |
| Toluene | .05 | 20.00 | 4.00 | .01 | 10 | 2.30 | 3.70 |
| 1,1,1-Trichloroethane | .07 | 0.04 | 0.20 | .02 | 60 | 0.04 | X |
| 1,1,2-Trichloroethane | X | X | X | X | X | X | X |
| Trichloroethylene | X | 0.04 | 0.07 | X | X | X | 0.30 |
| Vinyl Chloride | X | X | X | X | X | X | X |
| m-Xylene | 50.00 | 70.00 | 80.00 | .02 | 700 | 100.00 | 50.00 |
| o & p-Xylene (as o-Xylene) | 90.00 | 100.00 | 120.00 | .04 | 1,400 | 170.00 | 90.00 |
| Flash Point (°F) | 84 | 118 | 108 | 112 | >160 | 80 | 110 |

[1/] All concentrations in parts per million (ppm).
X = Analyzed but not detected.

o T106 and T104 contained elevated levels of dichloromethane and PCE.

### 3.2 Potential Threats Posed by the Abandoned Underground Storage Tanks

A significant threat to the ground water resource is presented by the subsurface storage of wastes at the Accra Pac site. Contamination of private water wells believed to be downgradient of the site has been documented. Many of the contaminants detected in the wells are also present within the tanks. It is not possible to make a determination of the actual extent of contamination within the ground water, if any, resulting from these tanks, as:

- o No determination as to the current structural integrity of the tanks (i.e., if the tanks are leaking) has been made.
- o Other sources of contamination may exist.

Potential sources of contamination other than the tanks themselves include neighboring industrial facilities, as well as materials released from the Accra Pac plant during the fire in 1976. Water from fire fighting efforts may have caused a significant influx of contaminants into the subsurface environment.

Despite the current lack of definitive evidence that the subsurface tanks are impacting ground water, they do pose a very serious potential threat to this resource. Data obtained from the United States Geological Survey (U.S.G.S.)1/ indicates that the water table in the area is quite shallow (4 to 5 feet below grade) and indigenous soils are highly permeable. As such, the ground water resource is highly vulnerable to contamination. Furthermore, the shallow water table indicates that portions of the subsurface tanks are most likely in direct contact with the ground water, thus, accelerating deterioration of the steel and also making cathodic protection impossible. Furthermore, influx of contaminants into the ground water will, most likely, ultimately affect the St. Joseph River, which is the discharge point for the uppermost aquifer in this region.

A significant threat of fire/explosion also exists at the site. Materials contained in tanks 102 and 106 are highly combustible as exhibited by the flash points (<56°F) of the material. Materials contained in T101, T104, T107, and T112 have flash points between 75° and 85°F. Table 3 provides a brief summary of chemical and toxicity data for select compounds found at the Accra Pac site.

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1/ Hydrogeologic and Chemical Evaluation of the Groundwater Resources of Northwest Elkhart County, Indiana, T.E. Imbrigiotta and A. Martin, Jr., U.S.G.S. 1981.

TABLE 3

CHEMICAL/TOXICITY DATA FOR SELECT COMPOUNDS
ACCRA PAC, ELKHART, INDIANA

| Compound | Flash Point (F°F) | % LEL | Water Solubility (mg/l) | TLV-TWA (ppm) | $LD_{50}$ (g/kg) | 10-Day HA (mg/l) |
|---|---|---|---|---|---|---|
| Ethyl Benzene | 59 | 1.0 | 152 | 100 | 3.5-5.46 | 2.1 |
| Toluene | 40 | 1.27 | 535 | 100 | 70 | 6.0 |
| Trichloroethylene | NF | NF | NR | 50 | 4,920 | ID |
| 1,1,1-Trichloroethane | NF | NF | 44 | 350 | 5.7-14.3 | 35 |
| Xylenes | 81-90 | 1.0 | 175 | 100 | 4.3-5.0 | 7.8 |

% LEL = Percent Lower Explosive Limit
TLV-TWA = Threshold Limit Value - Time Weighted Average.
$LD_{50}$ = *Lethal Dose 50, reported as oral dose in rats except* 1,1,1-Trichloroethane, which was reported as oral dosage for several species.
10 Day HA = Draft 10 Day Health Advisory for 10 kg child as recommended by U.S. EPA-Office of Drinking Water (ODW).
NF = Nonflammable.
NR = Not reported.
ID = Insufficient data for calculation.
Sources: Condensed Chemical Dictionary, 10th Ed.
Threshold Limit Values 1984-5, ACGIH
Draft Health Advisories, 9-30-85, U.S. EPA-ODW

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## 4.0 RECOMMENDATIONS

Due to the aforementioned threats, it is recommended that an Immediate Removal Action be implemented to address the underground tanks at the old Accra Pac site. The TAT is herein presenting a multi-phased cleanup approach that incorporates two alternatives for the later phases.

Phase 1 of the cleanup will entail the removal and disposal of materials presently within the 13 subsurface storage tanks. It is recommended that this phase be implemented as soon as possible. The second phase will address the tanks themselves. Option A for this phase will entail the exhumation and disposal/scraping of each tank. Option B will entail the in-situ backfilling of the tanks. The final phase of the Action will address the ground water resource which is potentially or actually affected by leakage of contaminants from the tanks. Figure 3 provides a flow chart of the various recommended actions for the Accra Pac site. Following is a detailed discussion of each phase.

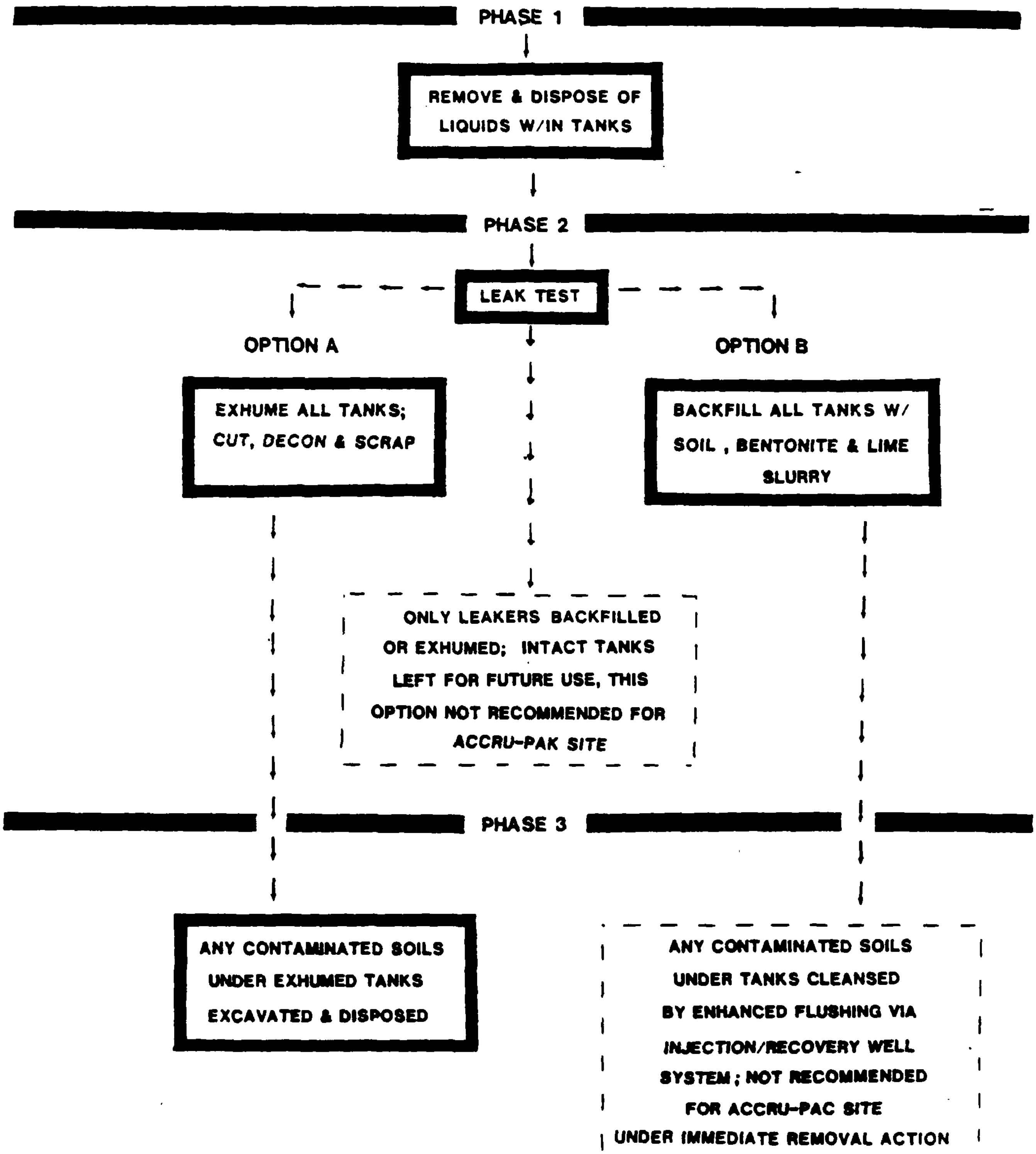
Phase 1 activity will include the removal of all materials within the tanks and its transport and disposal. Material removal will be accomplished by breaking a small hole in the overlying concrete pad, excavating to the top of the tank and cold chiseling a small hole in the tank. Hose connected directly to the vac tanker truck used for transport to the disposal site will be introduced into this hole for complete removal of the tank contents. Due to the fact that the actual dimensions of the tanks are unknown, the total volume of materials contained within had to be estimated. This was accomplished by assuming that all the tanks which were not full (and, hence contained unknown volumes of material) were of common size and dimension, 10 feet diameter and 20 feet in length). The dip stick measurements were then used to obtain a volume estimate. By this method a total volume estimate of 12,000 gallons was derived. On-site air monitoring, utlizing a flame or photoionizer and/or air pumps with charcoal sampling tubes, will be utilized during phases 1 and 2. Transport and disposal costs were estimated by utilizing current rates for incineration at the SCA incinerator in Chicago, Illinois. The costs for 16 incinerator parameter analyses have also been included. As Section 5.1 of this report illustrates, total cost for Phase 1 will be approximately $86,000 and will take an estimated five days to complete.

Upon evacuation of materials from the tanks, it is recommended that each tank be leak-tested. If none of the 13 tanks is found to be leaking, the Agency may wish to reconsider the need for implementing Phase 2 of the recommended actions, since an Imminent Threat no longer exists. This would be particularly significant as the Accra Pac site is not

FIGURE 3

FLOW CHART FOR RECOMMENDED ACTIONS AT

ACCRU-PAC SITE, ELKHART, IN



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abandoned, and the owner has indicated a desire to resume operations at the site. If leaking tanks are encountered, it is suggested that all 13 tanks be addressed, for reasons which are discussed later in the report. Attachment C provides materials and price quotations received from a contractor specializing in tank testing. It should be noted, however, that the water required for the test will require disposal. If the test water is transferred from tank to tank, 7,000 gallons (the volume of the largest tank) will be required, resulting in an additional $2,740 for disposal and transportation costs (based upon a disposal fee of $0.22/gallon at Chem Clear, Chicago, Illinois, and a transportation charge of $1,200 for two tanker loads to said facility), in addition to the $9,050 quoted for the leak testing, or approximately $14,000 total (with 15% contingency).

Phase 2, Option A involves the exhumation of all 13 tanks. Due to the fact that a cement pad overlies these tanks, such a task is anticipated to be labor-intensive. Upon breaking the pad, each tank will be exhumed and purged with compressed air until a noncombustible interior atmosphere is obtained. If this proves infeasible, a water blanket may be utilized to further reduce volatile emissions from the material remaining in the tank, or a compressed-air brass chisel may be used to cut an opening wherein a rinse of the tank's interior can be accomplished. For cost estimation, it was assumed that air purging would be feasible. If air purging allows the cutting of a tank by ~~welding equipment~~ (a much faster operation than chiseling), an opening of adequate size will be made in order to perform a decontamination rinse of the tank (as was described for the cold chisel operation). It is assumed that 3,000 gallons of decontamination rinse will thus be generated. Disposal of the decon rinsate will be made in a similar fashion as the evacuated materials in Phase 1. Upon decontamination, the tanks will be cut with welding torches into pieces manageable for transport. The metal can be disposed of, or possibly sold for scrap. Cost estimates are provided which include a disposal fee. The total yardage of scrap metal and miscellaneous debris is estimated at 200 cubic yards. At this time, soil and/or water phase samples may be collected from under each tank for evidentiary purposes. Additionally, soils under leaking tanks which are grossly contaminated may be excavated at this time. Costs for landfilling 200 cubic yards of soil have been included in this option's estimate. Costs for this option, as provided within Section 5.2, are estimated at $326,000. It is anticipated that Option A of Phase 2 will require 25 days to complete.

Phase 2, Option B will involve the in-situ securing of the tanks. Once evacuated, the tanks can be backfilled in order to prevent their future use. A variety of materials can be used for backfill, including soil, bentonite, bentonite and/or lime slurries, or cement, cement-bentonite mixtures. Slurrying can be accomplished on site with a cement mixer or roll-off box. Due to the quantity of materials involved, a cement mixer was used for the cost estimates. It is suggested that the backfill material contain lime or lime-containing constituent (i.e., cement). This will provide for the chemical binding of residual materials within the tanks. For cost estimating purposes, a backfill slurry of 50% soil (from on-site sources), 45% bentonite, and 5% lime was utilized. A total of 64,500 gallons or 320 cubic yards of backfill slurry will be required for all 13 tanks. Backfilling has the distinct advantage in that the labor-intensive operations of pad breakage, tank exhumation, and cutting are avoided.

A generic alternative to the above options at a site such as Accra Pac would involve the backfilling or exhuming only those tanks found to be leaking via the aforementioned leak test. Nonleaking tanks may then be secured for later use. At the Accra Pac site, however, the tank bottoms are believed to be in contact with the water table, a situation which will likely hasten their eventual leakage. Additionally, the November 8, 1984, amendments to the Resource Recovery and Conservation Act (RCRA) regarding underground storage tanks provide additional guidance. The Interim Prohibition within these amendments states that new tanks intended for the housing of regulated substances must be "cathodically protected, constructed of noncorrosive materials, steel clad with a noncorrosive material, or designed in a manner to prevent the release or threatened release of any stored substance." Based upon current knowledge of the Accra Pac tanks, it appears unlikely that these standards could be met. While said standards only apply to new tank installation, it is recommended that they be utilized for guidance with regard to any CERCLA-funded actions addressing these tanks. Therefore, it is suggested that all the tanks be either exhumed or backfilled.

While Option B of the second proposed phase eliminates the more labor-intensive operations required within Option A, it will not allow for the direct subsurface sampling of soils or ground water under each tank, and will also not allow for exhumation of grossly contaminated soils which might be present under a leaking tank. Evidence of leaking may still be obtained, however, by means of the aforemetioned test. In the event that the Agency would desire establishment of monitor wells to assess the site-specific impact of the ground water, costs for installation of four shallow monitor wells (one upgradient, three downgradient) have been estimated at $38,000. As such wells are not felt to be a necessary component of an

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Immediate Removal at this site, this cost has not been detailed in the cost summary provided in Section 5.

Phase 3 of the proposed action addresses the removal of existing subsurface contamination under any of the tanks which may be leaking. If Option A of phase 2 is instituted (i.e., if all the tanks are exhumed), any grossly contaminated soils can be exhumed and disposed of. Costs for such a task were included within the costs for Phase 2, Option 2. Removal of subsurface soils will obviously not be possible if Option B of Phase 2 (i.e., in-situ backfilling) is instituted. It should be noted that the imminent threat posed by contamination of the local ground water resource is presently being addressed by the Agency via the distribution of bottled water and provision of hook-ups to the public water supply system to residents within the areas of most critical concern (i.e., the residential area between the Accra Pac site and the St. Joseph River). Therefore, it is suggested that the Agency's efforts to address the existing contamination (which, as mentioned previously, may be due to a number of potential sources) would be more appropriately handled by the remedial program. Should the Agency wish to address this phase of contamination at the Accra Pac site and still utilize the backfilling approach, enhanced contaminant flushing and recovery by an injection and recovery well system may be feasible. If monitor wells are estabished on site, it may be possible to eventually use them in such a system as recovery or injection wells. Such a remedial-type action should, therefore, be considered when detailing the construction specification and locations of any such monitoring wells. The enhanced flushing of subsurface soils or installment of monitor wells is not recommended as part of an Immediate Removal Action for reasons just discussed. If the tanks are exhumed, removal of grossly contaminated soils is being recommended, as it is felt that such an action would be cost-effective for the Agency in the long run (i.e., as long as such soils are exposed, they can more easily be removed, than be dealt with under a larger scope, Remedial-type Action).

## 5.0 ESTIMATED COSTS

### 5.1 Phase I - Removal and Disposal of Product

**Labor**

| Item | Days | Amount |
|---|---|---|

Redacted-information not relevant to selection of removal action.

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Labor (Continued)

| Item | Days | Amount |
|---|---|---|

Redacted-information not relevant to selection of removal action.

| | | |
|---|---|---|
| Total Labor | | $10,090.00 |

Equipment

| Item | Days | Amount |
|---|---|---|
| 50' 3" hose @ $.75/ft/day | 5 | $187.50 |
| 1 Air compressor @ $97.00/day | 5 | 485.00 |
| 100' Air line @ $.35/ft/day | 5 | 175.00 |
| 1 Passenger van @ $68.00/day | 5 | 340.00 |
| 2 Passenger sedans @ $53.00/day | 5 | 530.00 |
| 1 Decon trailer @ $314.00/day | 5 | 1,570.00 |
| 1 Office trailer @ $72.00/day | 5 | 360.00 |
| 2 OTR @ $240/day | 2 | 960.00 |
| 2 Sets of hand tools @ $11.00/day | 5 | 110.00 |
| 2 Level B @ $164.00/day | 5 | 1,640.00 |
| 2 Level C @ $59.00/day | 5 | 590.00 |

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Equipment (Continued)

| Item | Days | Amount |
|---|---|---|
| Cascade system @ $54.00/day | 5 | $270.00 |
| Air monitoring | 5 | (Agency supplied) |
| Mobilization and demobilization | | 1,300.00 |
| Total Equipment | | $8,517.50 |

Materials and Miscellaneous

| Item | Amount |
|---|---|
| 16 Samples @ $150/incinerator parameter (13 from tanks, 3 for tanker loads) | $2,400.00 |
| Electrical hook-ups | 1,000.00 |
| Telephone | 1,000.00 |
| Total Materials and Miscellaneous | $4,400.00 |

Disposal and Transportation

Disposal Assumptions: Chlorine content <50%
BTU <8,000
Ash content <5%
Product weighs 8.00 lb/gal
12,000 gal of product

Disposal

| | |
|---|---|
| 12,000 gal x 8.00 lb/gal = 96,000 lbs<br>96,000 lbs x $.45 lb | $43,200.00 |

Transportation

| | |
|---|---|
| 3 - 5,000 gal trucks loads @ $4.00/mi<br>Elkhart to SCA Chicago = 150 mi<br>150 mi x $4.00/mi x 3 | 1,800.00 |
| Total Disposal and Transportation | $45,000.00 |

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Summary Phase 1 Costs

| Item | Amount |
|---|---|
| Labor | $10,090.00 |
| Equipment | 8,517.50 |
| Materials and Miscellaneous | 4,400.00 |
| Disposal and Transportation | 45,000.00 |
| TAT Costs | 5,200.00 |
| EPA Costs | 1,250.00 |
| Total Phase I Costs | $74,457.50 |
| 15% Contingency | 11,168.63 |
| | $85,626.13 |
| | or say |
| | $86,000.00 |

5.2 Phase II - Tank Removal or In Situ Securing

5.2.1 Leak Test

| | |
|---|---|
| Subcontract for testing (per quote) | $9,050.00 |
| **Test Water Disposal and Transportation** | |
| **Disposal** | |
| 7,000 gallon x $.22/gallon | 1,540.00 |
| **Transportation** | |
| 2 5,000-gal trucks @ $4.00/mi<br>Elkhart to Chem Clear, Chicago @ 150 mi<br>150 mi x $4.00 x 2 | 1,200.00 |
| Total Leak Test | $11,790.00 |
| 15% Contingency | 1,770.00 |
| | $13,560.00 |
| | or say |
| | $14,000.00 |

5.2.2 Option A - Tank Excavation and Removal

It is estimated that 25 working days will be required to excavate, decontaminate, and dismantle the tanks. An estimated 200 cubic yards of soil immediately surrounding the tanks will also be removed and disposed of in a secure landfill.

WESTON

**Labor**

| Item | Days | Amount |
|---|---|---|

Redacted-information not relevant to selection of removal action.

| Item | Days | Amount |
|---|---|---|
| 12 Per diems @ $63/day | 25 | 18,900.00 |
| Total Labor | | $92,296.00 |

**Equipment**

| Item | Days | Amount |
|---|---|---|
| 1 Crane @ $227.50/day | 25 | $5,675.00 |
| 1 Dozer @ $243.40/day | 25 | 6,085.00 |
| 1 Backhoe @ $492.00/day | 25 | 12,300.00 |
| 100' 3"hose @ $.75/ft/day | 25 | 1,875.00 |
| 1 Air compressor @ $97.00/day | 25 | 2,425.00 |
| 100' air line @ $.35/ft/day | 25 | 875.00 |
| 2 Passenger vans @ $68.00/day | 25 | 3,400.00 |

WESTON

Equipment (Continued)

| Item | Days | Amount |
|---|---|---|
| 2 Passenger sedans @ $53.00/day | 25 | $2,650.00 |
| 1 Decon trailer @ $314.00/day | 25 | 7,850.00 |
| 1 Office trailer @ $72.00/day | 25 | 1,800.00 |
| 2 Sets of hand tools @ $11.00/day | 25 | 550.00 |
| 4 Level B @ $164.00/day | 25 | 16,400.00 |
| 4 Level C @ $59/day | 25 | 5,900.00 |
| 1 Welder's truck @ $151.00/day | 25 | 3,775.00 |
| 1 Cascade @ $54.00/day | 25 | 1,350.00 |
| 1 8,000-gal Pool @ $110/day | 25 | 2,750.00 |
| 1 Jackhammer @ $155/day | 15 | 2,325.00 |
| 1 Portable high pressure laser @ $421.00/day | 25 | 10,525.00 |
| 3 OTR @ $240/day | 2 | 1,440.00 |
| 3 Lowboys @ $175/day | 2 | 1,050.00 |
| 1 Vacuum truck @ $293.00/day | 25 | 7,325.00 |
| Air monitoring | 25 | (Agency supplied) |
| Mobilization and demobilization | | 2,435.00 |
| Total Equipment | | $100,760.00 |

Materials and Miscellaneous

| Item | Amount |
|---|---|
| 2 Samples @ $150/sample for disposal parameters | $300.00 |
| 10 Soil VOC samples @ $100/sample | 1,000.00 |
| 1,000 cu yd clay @ $10/cu yd | 10,000.00 |

WESTON

Materials and Miscellaneous (Continued)

| Item | Amount |
| --- | --- |
| 8 Samples @ $150/ea | $1,200.00 |
| Telephone | 500.00 |
| 20 Rolls plastic sheeting @ $120/roll | 2,400.00 |
| Total Materials and Miscellaneous | $15,400.00 |

Transportation and Disposal

It is estimated that 3,000 gallons of water will be used to decontaminate tanks and equipment. This water will have contaminant levels below 10,000 ppm and will be able to be disposed of at Chem Clear in Chicago, Illinois.

Disposal

| Item | Amount |
| --- | --- |
| Contaminated water disposed at Chem Clear, Chicago, Illinois 3,000 gal @ $.22/gal | $660.00 |
| Contaminated soil disposed at Adams Center, Ft. Wayne, Indiana 200 cu yds @ $120/cu yd | 24,000.00 |
| Decontaminated debris and scrap tanks disposed at the sanitary cell at Wayne Disposal, Belleville, Michigan 200 cu yds @ $15/cu yd | $3,000.00 |

Transportation

| Item | Amount |
| --- | --- |
| 1 5,000-gal tanker to Chem Clear @ $4/loaded mi x 150 mi | $600.00 |
| 12 Loads of soil at Adams Center @ $4/loaded mi x 100 mi | 4,800.00 |
| 12 Loads of decontaminated tanks to Wayne Disposal @ $4/loaded mi x 200 mi | 9,600.00 |
| Total Disposal and Transportation | $42,660.00 |

WESTON

Summary: Phase II, Option A

| | |
|---|---|
| Labor | $92,296.00 |
| Equipment | 100,760.00 |
| Materials and Miscellaneous | 15,400.00 |
| Disposal and Transportation | 42,660.00 |
| TAT Costs | 26,000.00 |
| EPA Costs | 6,250.00 |
| Total Phase II, Option A | $283,366.00 |
| 15% Contingency | 42,505.00 |
| Total | $325,871.00<br>or say<br>$326,000.00 |

5.2.3 Option B - In Situ Securing of Tanks

Labor

| Item | Days | Amount |
|---|---|---|

Redacted-information not relevant to selection of removal action.

| | | |
|---|---|---|
| 5 Per diems @ $63/day | 5 | 1,575.00 |
| Total Labor | | $9,115.00 |

Equipment

| Item | Days | Amount |
|---|---|---|
| 2 Passenger sedans @ $53.00/day | 5 | $530.00 |

WESTON

Equipment (Continued)

| Item | Days | Amount |
| --- | --- | --- |
| 2 Sets of hand tools @ $11.00/day/set | 5 | $110.00 |
| 2 Level B @ $164.00/day | 5 | 1,640.00 |
| 3 Level C @ $59.00/day | 5 | 885.00 |
| 1 Cascade @ $54.00/day | 5 | 270.00 |
| 1 Vacuum truck @ $293.00/day | 5 | 1,465.00 |
| 1 Decontamination trailer @ $314.00/day | 5 | 1,570.00 |
| 1 Office trailer @ $72.00/day | 5 | 360.00 |
| 1 Cement mixer @ $250/day | 5 | 1,250.00 |
| 1 OTR @ $240/day | 2 | 480.00 |
| 1 Lowboy @ $175/day | 2 | 350.00 |
| 1 Backhoe @ $227/day | 5 | 1,135.00 |
| Mobilization and demobilization | | 680.00 |
| Total Equipment | | $10,725.00 |

Materials and Miscellaneous

| Item | Days | Amount |
| --- | --- | --- |
| 160 cu yds soil (on-site source) | | -- |
| Bentonite, 144 cu yds @ $37.42/cu yd | | $5,388.48 |
| Lime, 16 cu yd @ $37.42/cu yd | | 598.72 |
| Total Materials | | $5,987.20 |

WESTON

Summary: Phase II, Option B

| | |
|---|---|
| Labor | $9,115.00 |
| Equipment | 10,725.00 |
| Materials and Miscellaneous | 5,987.20 |
| TAT Costs | 2,600.00 |
| EPA Costs | 1,250.00 |
| Total Phase II, Option B | $29,677.20 |
| 15% Contingency | 4,451.58 |
| Total | $34,128.78 or say $34,000.00 |

5.3 Total Cost Summary

| | | |
|---|---|---|
| 5.3.1 | Phase 1 - Tank Evacuation and Material Disposal | $86,000.00 |
| 5.3.2 | Phase 2 - Option A Tank Removal with leak test | 340,000.00 |
| | versus | |
| | Option B Backfilling with leak test | 48,000.00 |
| 5.3.3 | Phase 1 with Phase 2 - Option A with 4 On-Site Monitor Wells | 426,000.00<br>+38,000.00<br>$440,000.00 |
| | Phase 1 with Phase 2 - Option B With 4 On-Site Monitor Wells | 134,000.00<br>+38,000.00<br>$172,000.00 |

# ATTACHMENT A

## RESIDENTIAL WELL SURVEY

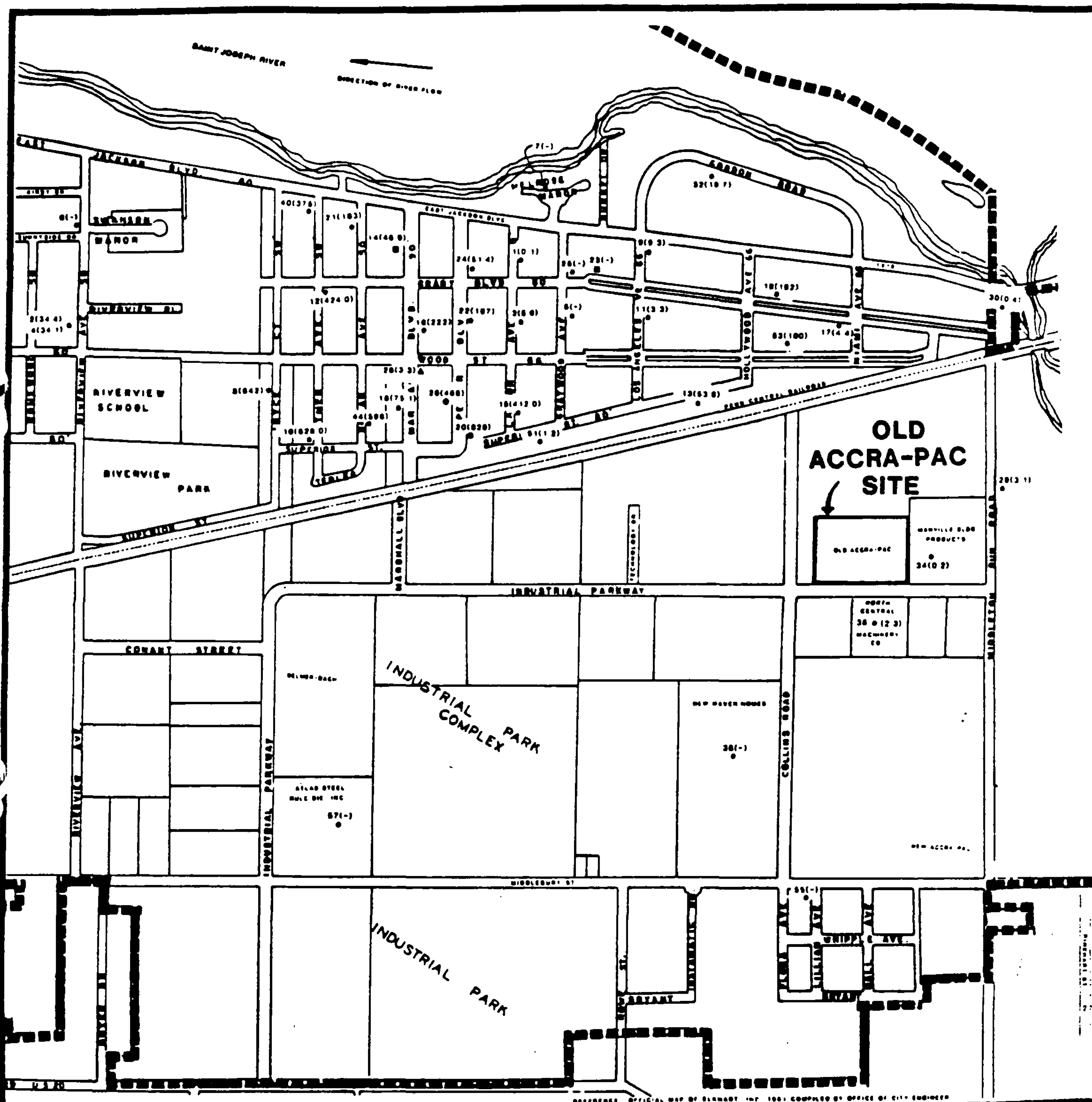



FIGURE 2

SITE MAP WITH SAMPLE LOCATIONS

GROUND WATER ASSESSMENT

ELKHART, INDIANA

LEGEND

● SHALLOW WELL LOCATION

■ DEEP WELL LOCATION

▲ CITY WATER SUPPLY

(#) TCE CONCENTRATION in PPB

(-) INDICATES NON DETECTABLE

SCALE 1"=4000

WESTON

RESIDENT WELL SAMPLING RESULTS
MAY 28-29, 1985
ELKHART, INDIANA
YELLOW ZONE
[illegible] in ppb)

| Sample # | Name | Address | Phone | TCE Results | |
|---|---|---|---|---|---|
| [redacted] | | | | 0.1 | |
| | | | | 34.4 | |
| | | | | 8.6 | |
| | | | | 34.1 | DUPE |
| | | | | X | |
| | | | | X | |
| | | | | X | |
| | | | | 842.0 | |
| | | | | 9.3 | |
| | | | | 828 | |
| | | | | 3.3 | |
| | | | | 424 | |
| | | | | 53.8 | |
| | | | | 46.9 | |
| | | | | 412 | |
| | | | | 222 | |
| | | | | 4.4 | |
| | | | | 75.1 | |
| | | | | 162 | |
| | | | | 828 | |
| | | | | 183 | |
| | | | | 197 | |
| | | | | X | |
| | | | | 51.4 | |
| | | | | X | |
| | | | | 468 | |
| | | | | X | |
| | | | | 3.3 | |
| | | | | 3.1 | |
| | | | | 0.4 | |
| | | | | 19.7 | |
| | | | | 0.2 | |
| | | | | 2.3 | |
| | | | | full scan | |
| | | | | X | |
| | | | | 375 | |
| | | | | 4.2 | |
| | | | | 597 | |
| | | | | 0.8 | [illegible] |
| | | | | 3.7 | |
| | | | | 0.4 | [illegible] |
| | | | | 1.2 | |
| | | | | 100 | |
| | | | | X | |
| | | | | X | |
| | | | | X | |
| | | | | .18 | [illegible] |
| | | | | 18.6 | |

Table 2
Roy F. Weston
VOC Analysis (ug/l)
P.O. # 19865

| | Detection Limit | Sample 36 |
|---|---|---|
| Benzene | 0.2 | X |
| Bromoform | 0.5 | X |
| Bromomethane | 1.0 | X |
| Carbon Tetrachloride | 0.1 | X |
| Chlorobenzene | 0.1 | X |
| Chloroethane | 1.0 | 5.7 |
| 2-Chloroethylvinyl Ether | 2.0 | X |
| Chloroform | 0.1 | 53. |
| Chloromethane | 6.0 | X |
| Dibromochloromethane | 0.1 | X |
| 1,2-Dichlorobenzene | 0.3 | X |
| 1,3-Dichlorobenzene | 0.3 | X |
| 1,4-Dichlorobenzene | 0.3 | X |
| Dichlorobromomethane | 0.1 | X |
| 1,1-Dichloroethane | 0.1 | 1120. |
| 1,2-Dichloroethane | 0.3 | 11.2 |
| 1,1-Dichloroethylene | 0.5 | 87.5 |
| 1,2-Dichloroethylene | 0.3 | 82.0 |
| Dichloromethane | 0.2 | 21.2 |
| 1,2-Dichloropropane | 0.5 | X |
| cis-1,3-Dichloropropene | 0.3 | X |
| trans-1,3-Dichloropropene | 1.0 | X |
| Ethylbenzene | 0.2 | X |
| 1,1,2,2-Tetrachloroethane | 0.1 | X |
| Tetrachloroethylene | 0.1 | 3.2 |
| Toluene | 0.1 | X |
| 1,1,1-Trichloroethane | 0.1 | 2200. |
| 1,1,2-Trichloroethane | 0.1 | P |
| Trichloroethylene | 0.1 | 2.1 |
| Vinyl Chloride | 0.5 | 2.5 |
| m-Xylene | 0.5 | X |
| o & p-Xylene (as o-Xylene) | 0.5 | X |
| Dichlorodifluoromethane | 20. | X |
| Trichlorofluoromethane | 0.2 | 130. |
| EPA Tag No. | | 5-163433 |
| Zimpro Analytical No. | | 11021 |

PRELIMINARY ROUGH DRAFT

X = Analyzed but not detected

P = Present but not quantitated

RESIDENT WELL SAMPLING RESULTS
~~JUNE 17, 1985~~ JUNE 17, 18, 19, 1985
ELKHART, INDIANA
YELLOW ZONE
[illegible] ppb

| Sample # | Name | Address | Phone | DCE Results | TCE Results | PCE Results |
|---|---|---|---|---|---|---|
| S-11 | [redacted] | [redacted] | | X | 19.7 | X |
| S-12 | [redacted] | [redacted] | | X | X | X |
| S-13 | [redacted] | [redacted] | | 119 | 7730 | 1.7 |
| S-14 | [redacted] | [redacted] | | 94.0 | 3180 | 0.3 |
| S-15 | [redacted] | [redacted] | | full scan | | |
| S-16 | [redacted] | [redacted] | | X | X | X |
| S-17 | [redacted] | [redacted] | | X | X | X |
| S-18 | [redacted] | [redacted] | | full scan | | |
| S-19 | [redacted] | [redacted] | | X | X | X |
| S-20 | [redacted] | [redacted] | | X | X | X |
| S-21 | [redacted] | [redacted] | | X | 0.9 | X |
| S-22 | [redacted] | [redacted] | | 760 | 2620 | [illegible] |
| S-23 | [redacted] | [redacted] | | X | X | [illegible] |
| S-24 | [redacted] | [redacted] | | 65.8 | 5620 | 0.7 |
| S-25 | [redacted] | [redacted] | | 65.8 | 658 | 24.7 |
| S-26 | [redacted] | [redacted] | | X | X | X |
| S-27 | [redacted] | [redacted] | | X | X | X |
| S-28 | [redacted] | [redacted] | | X | X | X |
| S-29 | [redacted] | [redacted] | | X | 0.2 | X |
| S-30 | [redacted] | [redacted] | | 0.5 | 35.6 | X |
| S-31 | [redacted] | [redacted] | | X | X | X |
| S-32 | [redacted] | [redacted] | | X | 1.2 | X |
| S-33 | [redacted] | [redacted] | | X | 2.9 | X |
| S-34 | [redacted] | [redacted] | | X | X | X |
| S-35 | [redacted] | [redacted] | | X | X | X |
| S-36 | [redacted] | 10 Longwood | | X | X | X |
| S-37 | [redacted] | 303 Simpson | | full scan | | |
| S-38 | [redacted] | Simpson | | full scan | | |
| S-39 | [redacted] | 400 James St. | | full scan | | |
| S-40 | [redacted] | 500 Simpson | | full scan | | |
| S-42 | [redacted] | 500 Simpson | | full scan | | |
| S-44 | [redacted] | 2617 E. Jackson | | X | X | X |
| S-46 | [redacted] | 208 Kenwood | | X | X | X |
| S-47 | [redacted] | | | X | 0.5 | X |
| S-48 | [redacted] | | | X | 0.5 | X |
| S-49 | [redacted] | | | | | |

[redacted] [illegible]

PRELIMINARY ROUGH DRAFT

S-51 [illegible] — Full Scan

PRELIMINARY ROUGH DRAFT

Roy F. Weston
VOC Analysis (ug/l)
P.O. # 19957

| | Detection Limit | S-15 | S-18 | S-37 | S-38 |
|---|---|---|---|---|---|
| Benzene | 0.1 | X | X | X | X |
| Bromoform | 0.5 | X | X | X | X |
| Bromomethane | 1.0 | X | X | X | X |
| Carbon Tetrachloride | 0.1 | X | X | X | X |
| Chlorobenzene | 0.1 | X | X | X | X |
| Chloroethane | 1.0 | X | X | X | X |
| 2-Chloroethylvinyl Ether | 2.0 | X | X | X | X |
| Chloroform | 0.1 | X | 0.2 | 460. | X |
| Chloromethane | 6.0 | X | X | X | X |
| Dibromochloromethane | 0.1 | X | X | X | X |
| 1,2-Dichlorobenzene | 0.3 | X | X | X | X |
| 1,3-Dichlorobenzene | 0.3 | X | X | X | X |
| 1,4-Dichlorobenzene | 0.3 | X | X | X | X |
| Dichlorobromomethane | 0.1 | 0.2 | X | 0.7 | 0.7 |
| 1,1-Dichloroethane | 0.1 | X | X | X | X |
| 1,2-Dichloroethane | 0.3 | X | X | X | X |
| 1,1-Dichloroethylene | 0.5 | X | 0.7 | 0.6 | X |
| 1,2-Dichloroethylene | 0.3 | 42.0 | X | 58.9 | 74.0 |
| Dichloromethane | 0.2 | X | 0.6 | 0.4 | X |
| 1,2-Dichloropropane | 0.5 | 6.4 | X | 6.4 | 5.8 |
| cis-1,3-Dichloropropene | 0.3 | X | X | X | X |
| trans-1,3-Dichloropropene | 1.0 | X | X | X | X |
| Ethylbenzene | 0.2 | X | X | X | X |
| 1,1,2,2-Tetrachloroethane | 0.1 | X | X | X | X |
| Tetrachloroethylene | 0.1 | X | X | 8.4 | X |
| Toluene | 0.1 | X | X | X | 0.1 |
| 1,1,1-Trichloroethane | 0.1 | 5.0 | 19.8 | 3.8 | 2.5 |
| 1,1,2-Trichloroethane | 0.1 | X | X | X | X |
| Trichloroethylene | 0.1 | 585. | 3.2 | 7320. | 11500. |
| Vinyl Chloride | 0.5 | X | X | X | X |
| Trichlorofluoromethane | 0.2 | X | X | X | X |
| | | | | | |
| EPA Tag No. | | 5-163203 | 5-163180 | 5-163211 | 5-163187 |
| Zimpro Analytical No. | | 11366 | 11367 | 11368 | 11369 |

X = Analyzed but not detected

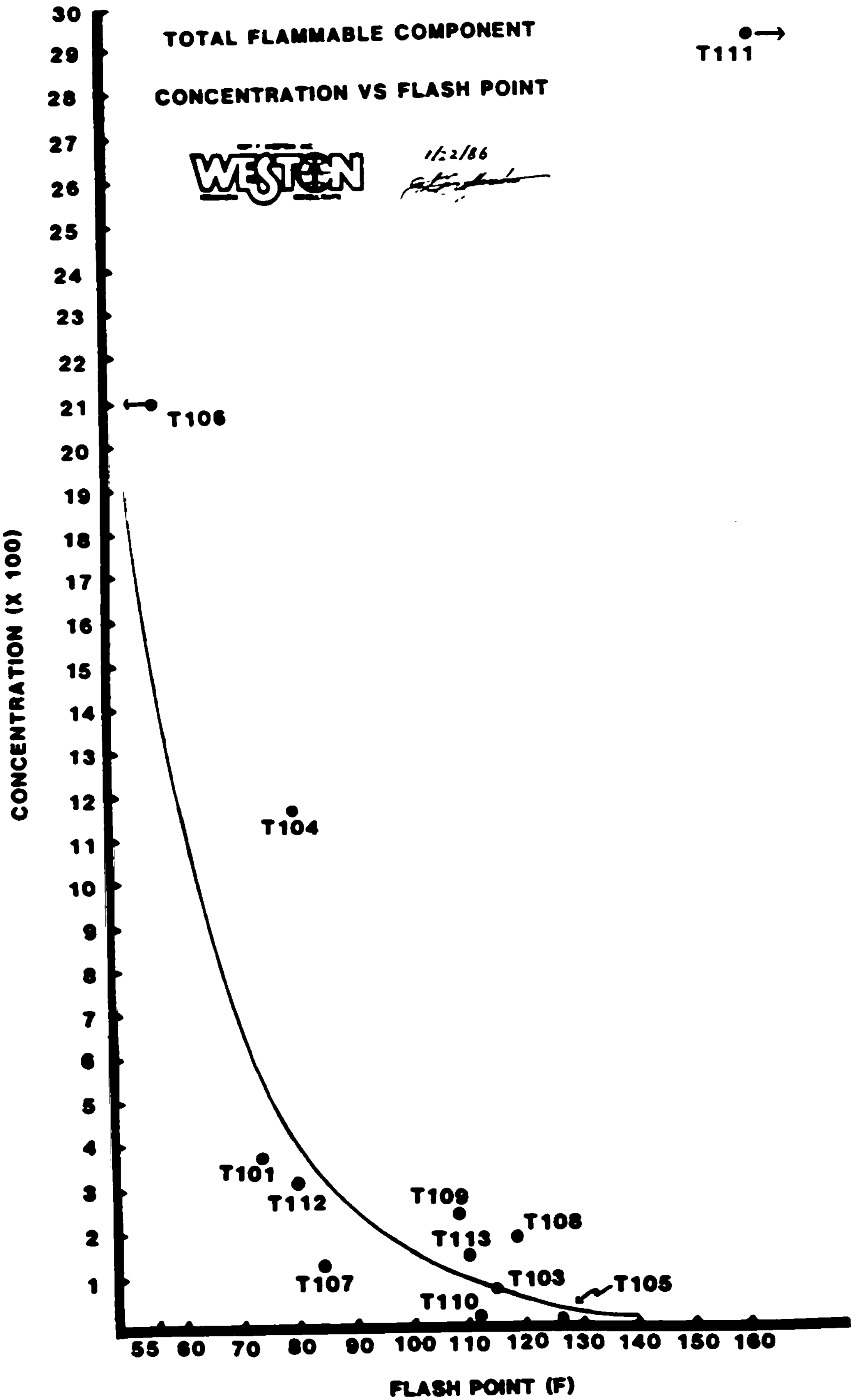
YELLOW (Continued)
JULY 24, 1985
85CY10

PRELIMINARY ROUGH DRAFT

| Section | Name | Address | Phone | Depth of Well | DCE, TCE, PCE, TCA | Full Scan | DCE | TCE | PCE | TCA | Full Scan |
|---|---|---|---|---|---|---|---|---|---|---|---|
| [redacted] | | | | | | | | | | | |

# ATTACHMENT B

## TOTAL FLAMMABLE COMPONENT CONCENTRATION VS FLASH POINTS


TOTAL FLAMMABLE COMPONENT
CONCENTRATION VS FLASH POINT
WESTON
1/22/86
CONCENTRATION (X 100)
30
29
28
27
26
25
24
23
22
21
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
T111
T106
T104
T101
T112
T109
T108
T113
T107
T103
T105
T110
55
60
70
80
90
100
110
120
130
140
150
160
FLASH POINT (F)

# ATTACHMENT C

## UNDERGROUND TANK TEST LITERATURE

ENVIRONMENTAL SERVICES, INC.

NEW CORPORATE ADDRESS!
115 Dewalt Ave. N.W., Suite 400
Canton, Ohio 44702
PHONE: 800-523-4370
IN OHIO: 216-453-1800

RECEIVED
DEC 23 1985
TAT REG V

December 19, 1985

Mr. Paul Aronian
Roy F. Weston Inc.
666 W. Dundee Road
Suite 1501
Northbrook, IL 60062

Dear Mr. Aronian:

Thank you for your interest in the Leak Lokator LD 2000 Precision test method. As we discussed, the following is a proposal to test your facility.

Basis: Thirteen (13) underground storage tanks containing hazardous wastes and water for testing purposes. Sizes range from 1,500 gallons to 7,000 gallons.

Location: Elkhart, Indiana

Example Test Schedule:
Day 1 - Test 3 tanks
Day 2 - Test 3 tanks
Day 3 - Test 3 tanks
Day 4 - Test 2 tanks
Day 5 - Test 2 tanks

Mr. Aronian, based on the above information, the total estimated cost for the location will be $9,050. The charges include full system tests (tank and lines) and a tank test, if necessary, when full system test fails. Price is also based on a two person team, test van and all related test equipment necessary to complete three system tests, ten (10) hour day and related travel to the location. On days when two or less tanks are tested a minimum daily charge is applied.

I have also enclosed for you some descriptive materials regarding the Leak Lokator LD2000 method of operation and background information on our company.

leak lokator

When your decision has been reached to utilize the services of Hunter Environmental Services, Inc., or if you have any additional questions please contact me at 1-800-523-4370.

Looking forward to working with Roy F. Weston, Inc. in the very near future.

Sincerely yours,

HUNTER ENVIRONMENTAL SERVICES, INC.

Maria Currier
Market Development Specialist

Enclosure

cc: G. Lohr
R. Evans

**HUNTER ENVIRONMENTAL SERVICES, INC.**
**18 Great Valley Parkway, Suite #6**
**Malvern, PA 19355**

LEAK LOKATOR -- the only known leak detection system to test underground tanks without excavation -- has grown rapidly since its introduction in 1981.

ABOUT THE SERVICE

Hunter Environmental Services, Inc. is a direct-service organization providing underground tank testing services utilizing the Leak Lokator LD2000. Testing is accomplished by Hunter trained two-person teams who are thoroughly knowledgable in the operation of the Leak Lokator equipment as well as pump and tank hardware. After an extensive training period of approximately six months consisting of field and classroom experience, our personnel are placed in the field as competent, highly qualified tank testing specialists.

Our teams are strategically placed throughout the United States which makes our service available nationally. Every detail is coordinated through our office in Malvern, Pennsylvania (outside Philadelphia) which makes testing easy and convenient for our customers.

Currently, teams are located in:

| | |
|---|---|
| Atlanta, Georgia | Long Island, New York |
| Baltimore, Maryland | Los Angeles, California |
| Boston, Massachusetts | Nashville, Tennessee |
| Chicago, Illinois | Philadelphia, Pennsylvania |
| Dallas, Texas | Pittsburgh, Pennsylvania |
| Fort Lauderdale, Florida | Puerto Rico |
| Houston, Texas | San Francisco, California |
| Kalamazoo, Michigan | Southern New Jersey |

Proposed team locations:

| | |
|---|---|
| Columbus, Ohio | Los Angeles, California |
| Fresno, California | Seattle, Washington |

The Leak Lokator service is not limited to the above areas as we have fulltime travelling teams and those teams listed above will also travel to meet your tank testing requirements.

## COMPANY BACKGROUND

Leak Lokator LD2000 was originally developed by SunTech (the research and engineering division of Sun Refining and Marketing Company) for use in Sunoco service stations. In late 1979, the decision was made to offer the Leak Lokator service external of Sun. The reception of this new technology was overwhelming, Leak Lokator was well-received both domestically and internationally.

In late 1981, with the reorganization of Sun Company, new strategies were developed to ensure long-term health and growth. Keeping with this strategy, the decision was made to divest the Leak Lokator Department from Sun Refining and Marketing Company. The divestment procedure was completed and effective May 13, 1983. A new corporation was established by a group of investors principally based in Connecticut and Hunter Environmental Services, Inc. was formed.

All employees of Sun, both management and field personnel, were transferred to Hunter. The transition was smooth and service to our customers was achieved without disruption.

## EQUIPMENT/EXPERIENCE

Since the introduction of the Leak Lokator service, over 22,000 tanks have successfully been tested. Although originally intended for use in the service station environment, the service has been expanded to include commercial/industrial customers as well, some of which are listed here.

Leak Lokator LD2000 is fast, efficient and highly accurate. Each test, after set-up, takes less than one hour to perform. The testing method is based on Archimedes' "Principle of Bouyancy" and measures leak rate by sensing weight changes in a sensor suspended in the liquid level of the tank.

The Leak Lokator instrumentation meets and certifies all tests at full system (Tank and Lines) according to the National Fire Protection Association's Pamphlet 329 ±0.05 GPH criteria for the Precision Test.

The Leak Lokator instrumentation has also completed and received approval of final classification by Underwriters Laboratories.

## CLIENTELE

Following is a partial list of ongoing and previous Hunter Environmental Services, Inc. customers:

### PROGRAM TESTING/MAJOR OIL COMPANIES

- Exxon Company USA
- Mobil Oil Company
- Phillips Petroleum
- Standard Oil Co. (Ohio)
- Texaco USA
- Shell Oil Company
- Getty Refining & Marketing Company
- Gulf Oil Corp.
- Sun Refining & Marketing Co.

### PERIODIC TESTING/MAJOR OIL COMPANIES & OTHERS

- Allstate Petroleum Equipment Company
- Biocraft, Inc.
- Clark Petroleum
- Ford Aerospace
- Givaudan Corp.
- Greyhound Lines
- Mead Packaging Co.
- Pratt & Whitney Corp.
- Royston Laboratories
- SPS Technologies
- Truck Stops Of America
- United Technologies - Inmont Corporation
- American Cyanamid
- Atlantic Richfield
- Chevron Oil Company
- Commuter Air Lines
- General Dynamics - Electric Boat Div.
- Hartz Mountain Ind.
- Mid-States Oil Co.
- Riggins Oil Company
- So. Maryland Oil
- 3M Company
- Union Oil Company
- USAir
- J.H. Williams Oil Co.
- American Oil Co.
- Automatic Data Processing
- L.P. Evans - Mercedes Benz
- W.R. Grace & Co.
- Kayo Oil Company
- Papercraft Corp.
- Rohm & Haas Co.
- Spartan Oil Co.
- TRC Environmental Consultants
- Wallace Oil Co.

### MILITARY INSTALLATIONS

- Fort Dix, NJ
- Ft. Belvoir, VA
- Scott AFB, IL
- Pease AFB, NH
- Ft. Lewis, WA
- Damneck Naval Training Center, VA
- Dover AFB, DE
- Langley AFB, VA

## SUBSTANCES TESTED

Although originally designed to be used in the service station environment, the Leak Lokator system has proven itself in the industrial/commercial market as well. Listed below are examples of products we have tested in addition to gasoline and fuel oils.

- Dichloroethane
- Toluene
- Acetone
- Alcohol
- Ethylacetone
- Methylethylketone
- Naptha
- Lactol Spirits
- Toluol
- Xylene
- Trichloroethane
- Heptane
- Hexane
- Methylenechloride
- Cellusolve
- Rotosal
- Propylacetate
- Cyclohexanol

PRICING ADVANTAGES

System Charge - includes a test on the tank and lines and if necessary, due to a full system leak, a separate test on the tank itself. THERE IS NO ADDITIONAL CHARGE FOR THE TANK TEST. It is also important to note that no excavation is required for the tank test with the Leak Lokator which results in considerable savings. Our ability to conduct tank tests without excavation also greatly reduces downtime of the facility.

OTHER KEY ADVANTAGES

Tank and Piping Leaks - easily differentiated without excavation.

Coordination - includes coordinating of all test scheduling, product deliveries and additional maintenance requirements, if necessary. This service reduces the involvement normally required by your company to properly schedule and coordinate testing.

Comprehensive Reports - includes results from each individual location with complete summarization of all testing, if desired. This becomes a valuable tool for your company management for making future decisions with regard to overall management of your facilities.

SALES

Hunter has a full staff of professional sales and customer service personnel located at our Malvern, Pennsylvania office. To supplement our sales efforts, we also have a network of distributors strategically located to handle sales on a local basis.

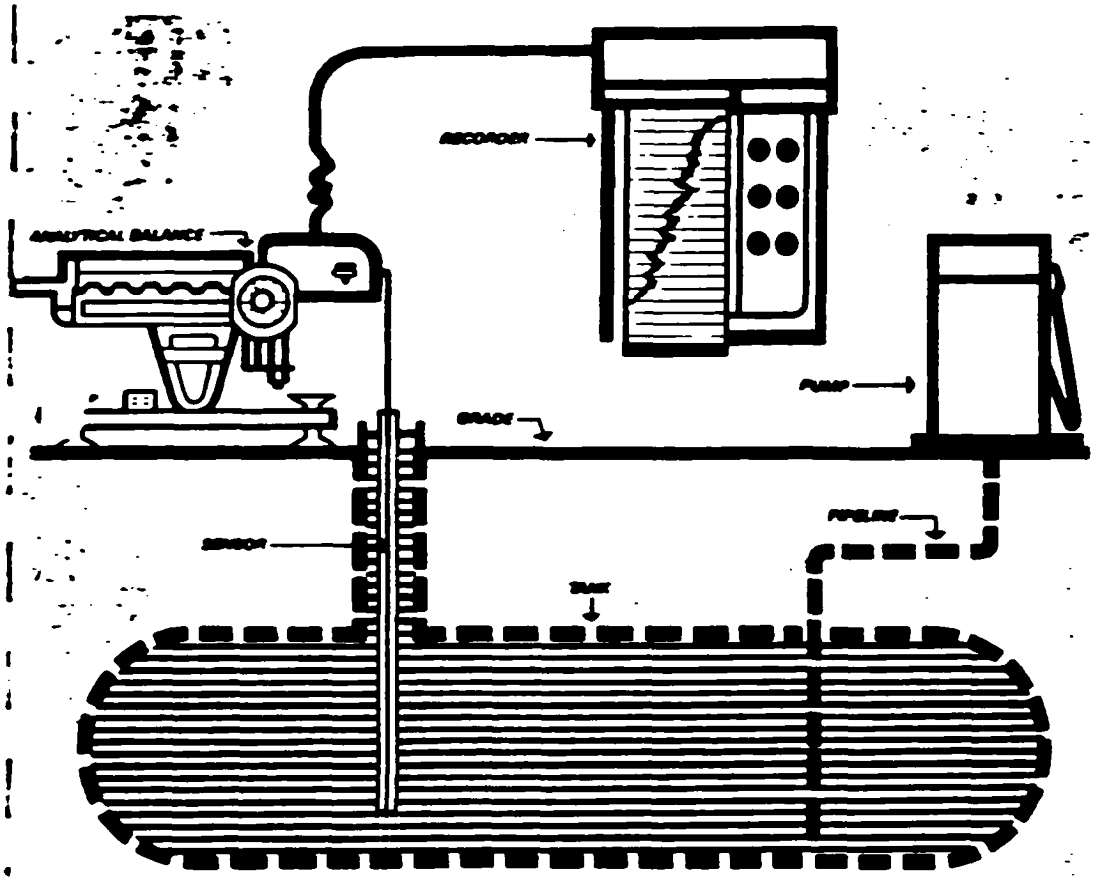
CONCLUSION

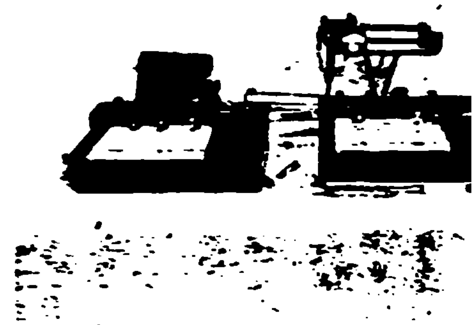
We consider the Leak Lokator LD2000 to be the most unique and innovative underground tank testing technology available today and hope once you have a chance to review our detailed literature, you will too!

01 0335

# leak lokator™* LD 2000

## tests underground tanks without excavating!





**FAST, EFFICIENT TANK TESTING BY PROFESSIONAL TEAMS**

### *Here's how Leak Lokator LD 2000 works:*

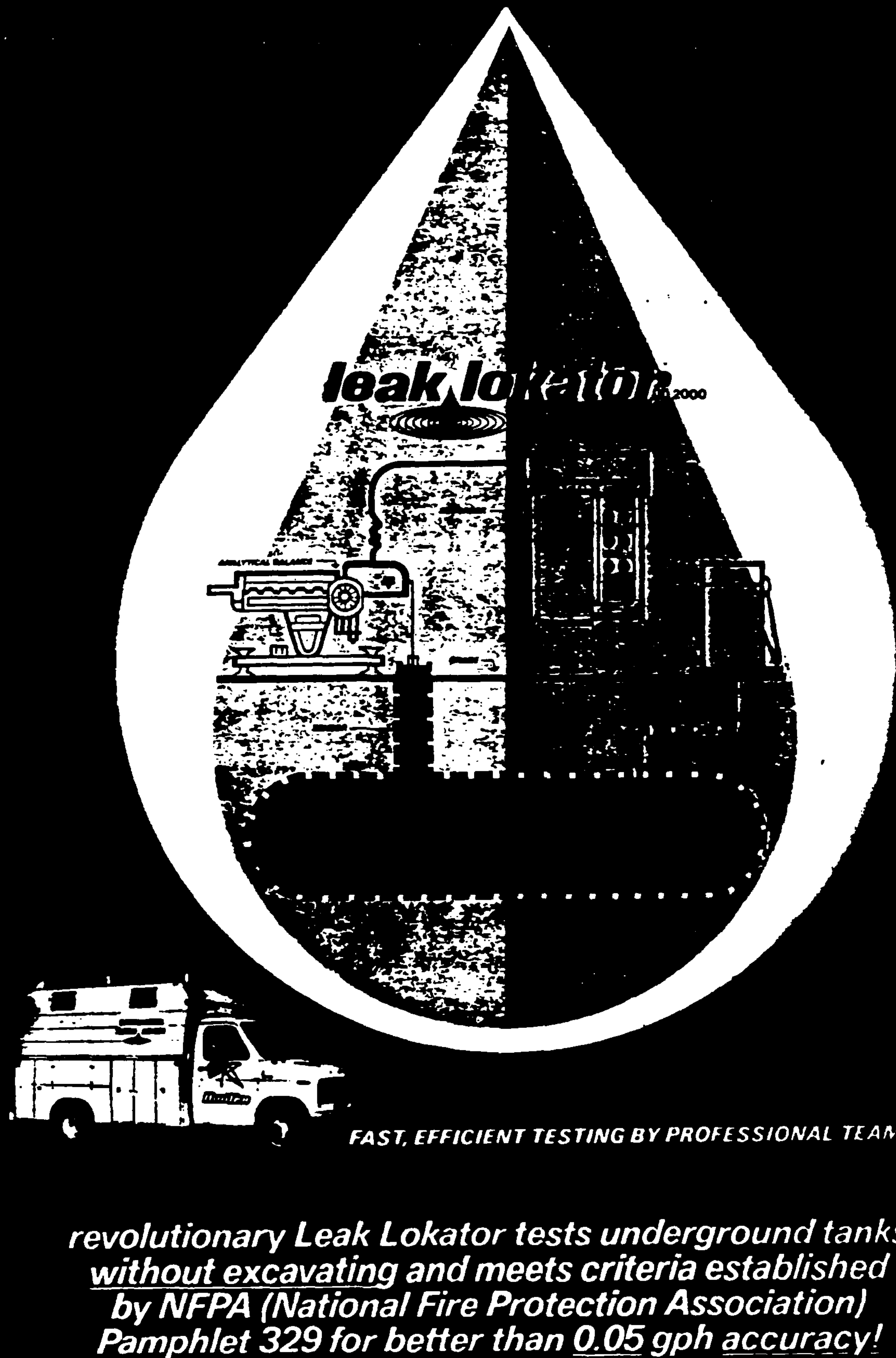
- Tests all underground industrial or service station tanks.
- Operates in underground tanks with 2" (50 mm) or larger opening—easily differentiates between piping and tank leaks
- Tank test can be conducted on the same day as full system test—without excavation
- Precise on-site measurement of product density is correlated with most recent API data on coefficient of expansion
- Manifold systems are tested as one.
- Temperature measurement is accurate to 0.001°F.
- Each test—including on-site calibration—takes less than one hour after set-up. A strip chart provides permanent uninterrupted record of all data.
- Automatically adjusts for variables like evaporation, vapor pockets and tank end deflection.
- Coordinator is available to schedule all pretest deliveries and maintenance

*Meets criteria established by NFPA (National Fire Protection Association) 329 Pamphlet
Accurate to 0.05 gph

*Write today for more information or call 215-296-7380*

HUNTER
ENVIRONMENTAL SERVICES, INC.
10 GREAT VALLEY PARKWAY, SUITE 6, MALVERN, PA 19355

01 0336



FAST, EFFICIENT TESTING BY PROFESSIONAL TEAMS

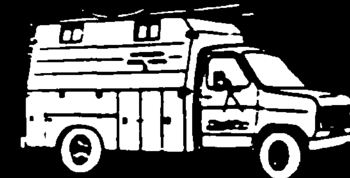
**revolutionary Leak Lokator tests underground tanks without excavating and meets criteria established by NFPA (National Fire Protection Association) Pamphlet 329 for better than 0.05 gph accuracy!**

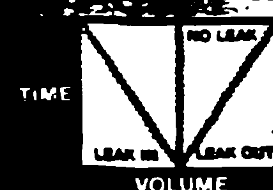
**ENVIRONMENTAL SERVICES, INC.**

01 0337

# leak lokator

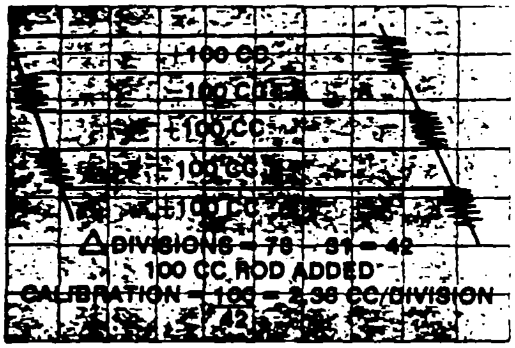
## in virtually any size underground tank system with 2" (50mm) or larger opening





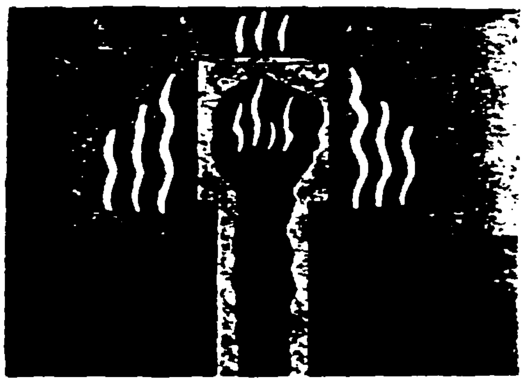
# each test takes less than an hour to compl

## here's how the Leak Lokator adjusts for all these variables:




### CALIBRATION

Calibration is conducted on site by quickly adding or removing a known quantity of the product being tested to, or from, the tank system This sudden change in volume results in a sharp deflection of the pen on the recorder. The number of chart divisions traversed is then divided into the quantity of liquid removed from, or added to, the tank to determine the number of cc's per division on the chart This procedure is repeated several times for each test

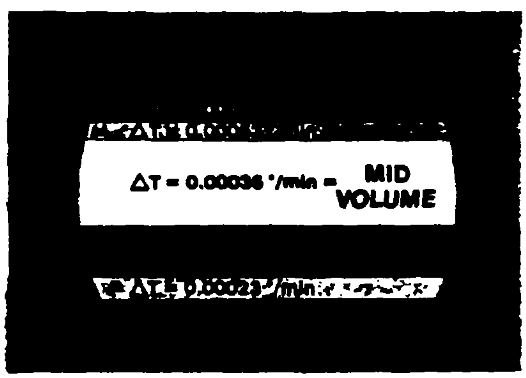


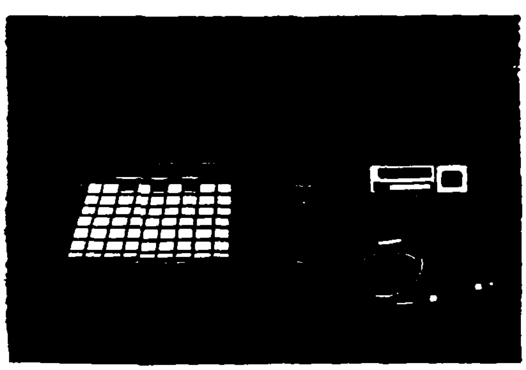
### EVAPORATION

Obviously, evaporation causes a drop in volume that, if uncompensated, would look like a leak on our recorder. But the LD2000 sensor compensates automatically for evaporation because it is a hollow cylinder.

This sensor is sealed at the bottom and is filled with the fluid being tested to a point a few inches higher than the liquid level in the tank. This gives the sensor the added weight necessary to bring it within the range of the analytical balance.

The inside diameter at the top of the sensor is slightly larger than that where the sensor enters the liquid. This results in a surface area inside the tube which is the same as the surface area being occupied by the tube itself in the liquid. For this reason, evaporation takes place from the surface area of the sensor at the same rate as from the surface area of the liquid being measured. As evaporation occurs from the hollow tube, the sensor becomes lighter. However, the buoyancy force exerted on the sensor by the liquid in the tank is decreasing at the same rate due to evaporation and, therefore, the entire loss is automatically compensated.



### TEMPERATURE

There are two important temperature factors to consider volume change and stratification. Hydrocarbon type liquids that are stored underground have a relatively large coefficient of volumetric expansion. A change of a fraction of a degree can change the volume by several gallons in a 10,000 gallon tank.

Complicating this situation is the normal presence of temperature stratification in underground tanks, i.e., temperatures varying from top to bottom. The top layer temperature may be several degrees higher than the bottom layer. Temperature stratification, however, is not as important as the rate of change of temperature in these various layers. Normally, the rate of change in the upper layers will be greater than those of the lower levels. The average of these top and bottom layers (0.000394°/m) will be close to the average of all layers (0.00039°/m) and will approximate the temperature rate change of the liquid at mid-volume (0.00036°/m).*

It can be further noted that a rate change produced by measuring at the average temperature (0.00024°/m) may not coincide with the overall layer average nor with the mid-volume rate change.

**The previous data was extrapolated from the SRI International Report for Project 7637, however, Leak Lokator has since corroborated this data with our own studies.*

# te after setup...minimizes downtime

Because of these observations, it is *important* that the fuel *not* be agitated or *circulated* during the test period or during the waiting period. It is equally *important* that the *mid-volume* temperatures are monitored very accurately to establish the volume change during the test period due to temperature change.

The Leak Lokator procedure utilizes a temperature probe sensitive to 0.001°F placed at mid-volume of the tank. The probe's output is electronically monitored by a strip chart recorder and digital meter. The recorder draws a trace of rate of change of temperature while the meter provides exact temperature readings to 0.001°F.

To further enhance the accuracy of the temperature compensation determinations, an actual measurement of product gravity and temperature is measured on site. Using a graph developed from the most recently published API ASTM data, gravity and temperature are correlated to a very precise coefficient of expansion for the product being tested.

## TANK-END DEFLECTION (PRESSURE)

One side effect of raising the liquid level in the tank system is a phenomenon known as "tank-end deflection." Tank-end deflection is a bulging out of the ends of a tank which occurs when the tank is filled to capacity and beyond.

Normally, in the LD2000 system, tank-end deflection is not a problem, since the pressure exerted by a fully-charged system is only about one pound per square inch. In addition, since this deflection occurs almost immediately after a system is topped off, the need for correction is virtually eliminated. However, if for some reason levels must be raised higher than normal, charts are provided for making tank capacity adjustments.

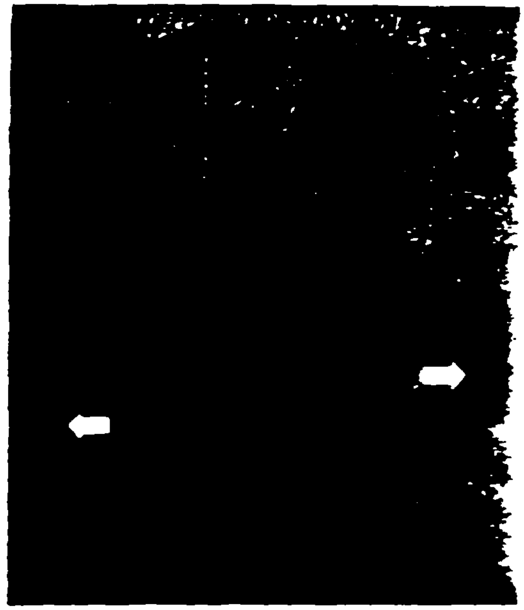
## VAPOR POCKETS

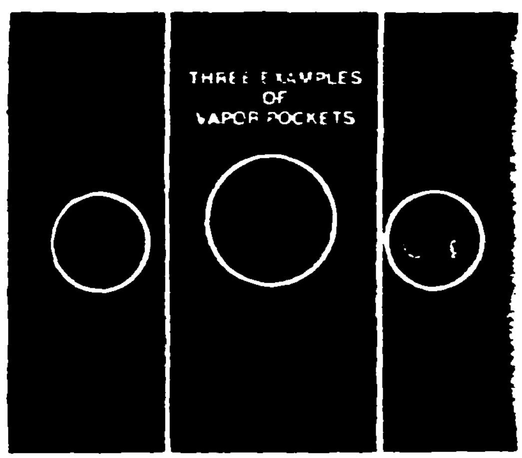
Vapor pockets are the final variable which can affect test results. Due to the short duration of the LD2000 test, vapor pocket compensation is rarely required because vapor pockets only affect test results when ambient barometric pressure or temperature increases or decreases very rapidly during the course of the test.

There are basically 3 types of vapor pockets: one that forms in the high end of a tank when the tank is not perfectly level, one that is trapped in the top of a manway, and one that is trapped at the top of a drop tube.

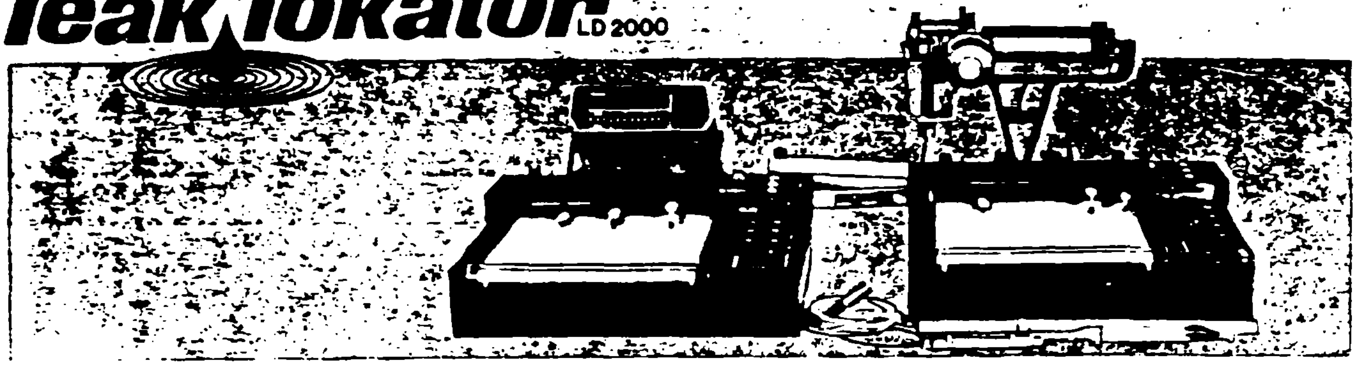
If a vapor pocket releases during a test due to a pressure decrease or temperature increase, the displacement will quickly offset to the right and then continue on the same pattern. There is no overall effect on the test results. Occasionally, when this happens, the displacement slope will change due to a system level change to a new cross-sectional area. If this occurs, a new test and calibrations must be determined.

If the barometric pressure rises, then the pocket will compress and the Leak Lokator will see this as an apparent leak. A rise in pressure is usually slower than a pressure drop. If the pocket size is four gallons or less, and if the barometric pressure change is less than 0.02 in. Hg/hr, no corrections are needed. Tables are provided to






# leak lokator LD2000



## here's how it works!

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- *Automatically adjusted for variables like evaporation, vapor pockets and tank-end deflection.*
- *Coordinator is available to schedule all pretest deliveries and maintenance.*

### *COMPARE THE UNIQUE ADVANTAGES OF THE LEAK LOKATOR SYSTEM!*

| | LEAK LOKATOR LD2000 | OTHER WELL-KNOWN METHOD |
|---|---|---|
| **TESTING TIME** (after setup) | Less than 1 hour | Typically 5 to 24 hours |
| DIFFERENTIATES BETWEEN TANK LEAKS AND PIPING LEAKS | Requires no excavation. Standard test procedure to test both full system and tank on same day. | Excavation required to isolate tank from piping. |
| VAPOR POCKETS | No effect on test results | Must be vented to properly test (Excava-tion typically required) |
| MANIFOLD TANKS SYSTEMS | Tested as one system | Each tank must be tested separately |
| MEASURES IN-LEAKS AND OUT-LEAKS | Standard procedure High water table has no effect. | Must compensate for high water table |
| TANK-END DEFLECTION | No effect on results. | Must compensate. |
| RECORD OF RESULTS | Continuous strip chart recording of both leak rate and temperature. | "Visual" readings taken on data sheets at periodic intervals |

01 0341

# leak lokator


# leak lokator

... confident, knowing that all testing is ... formed by trained teams who provide permanent ... results. A Coordinator is ... available to help with ... arrangements.

If you suspect a leak, contact Leak Lokator for additional information ... still — for a price quote.


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